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ROCKS and MINERALS

Vol. 4. No. 4. DECEMBER, 1929 Whole No. 14

Courtesy of Dr. H. C. Dake.

FAMOUS FOSSIL BEDS ON THE JOHN DAY HIGHWAY—CENTRAL OREGON.

SPECIAL NOTICE

If you are in favor of making ROCKS AND MINERALS a monthly by increasing the subscription price to $2 per year—then read the special announcement on the page facing page 103.

THE MAGAZINE FOR COLLECTORS

THE BULLETIN BOARD

THE ELECTION

Considerable interest was manifested by members of the Association in the election of officers for the ensuing year. Many ballots were cast and evidently marked with thoughtful consideration, as a large number do not fall into easily classified lists. We announce the result as follows:

President — Dr. Henry C. Dake; Vice-Presidents—Charles W. Hoadley, Dr. Bertha Chapman Cady, Dr. W. F. Foshag, Dr. L. J. Spencer, Morrell G. Biernbaum, Gilbert Hart, Noyes B. Livingston, Benjamin T. Diamond, M. Mawby, Edward Cahen.

Of the officers elected, two of the vice-presidents come into office for the first time. They are Dr. L. J. Spencer and Noyes B. Livingston. Dr. Spencer is Keeper of Minerals of the British Museum (Natural History) at London, England. Mr. Livingston is a prominent geologist connected with the Texas Oil Company at Fort Worth, Texas. We congratulate these gentlemen upon their election and welcome them as vice-presidents of the Association. Both have expressed a keen interest in the Association and its official organ, ROCKS AND MINERALS, and we are certain that as officers they will do much for the Association and the magazine.

Dr. Dake, of course, had the unanimous vote of the Association for President. The President's Page, contributed by Dr. Dake to each issue of the magazine, his keen and lively interest in the welfare of the magazine and the Association, and his frequent articles on mineralogical subjects, have won him a popularity which deservedly placed him at the head of the ticket without any opposition.

The retiring officers, E. Mitchell Gunnell and O. Ivan Lee, have served the Association faithfully and well from the time of its organization. Both are well known as contributors of articles to ROCKS AND MINERALS.

SPECIAL NOTICE

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WANTED: Correspondents in all parts of the world who will be kind enough to send us notes and news items on minerals, etc., that they think may be interesting to the subscribers of "Rocks and Minerals." Such as are available we shall be very glad to print in the magazine.

ROCKS AND MINERALS

The Magazine for Collectors

Published Quarterly

Peter Zodac
Editor and Publisher

The Official Journal of The Rocks and Minerals Association

Vol. 4, No. 4 DECEMBER, 1929 Whole No. 14

CONTENTS

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ROCKS AND MINERALS PEEKSKILL, N. Y., U. S. A.

ROCKS AND MINERALS A MONTHLY?

WE SHALL PUT IT UP TO THE SUBSCRIBERS

We have had hundreds of letters from our subscribers during the past few months urging us to issue ROCKS and MINERALS monthly even though we have to raise the subscription price to do this. The following letter is typical of the many we have received:

To the Editor of "R & M":

I take pleasure in enclosing check for $1 as renewal for another year to your interesting magazine. It is an excellent publication and I enjoy reading it very much. It has, however, one serious drawback—it does not come out often enough. Why not increase the subscription price and have ROCKS and MINERALS come out every month? I am sure that the subscribers in general would heartily approve this action and would cooperate with you in every way possible. Why not put it up to them?

We should like to make ROCKS and MINERALS a monthly. That is one of our ambitions. But the present subscription list does not warrant it unless the subscription is raised to three dollars a year, which is not one of our ambitions.

In thinking the matter over we believe the magazine could be made a monthly and the subscription kept down to two dollars if the subscription list were doubled. The magazine is returning no profit at present. Twelve issues instead of four means more work and greater expense. Nevertheless, we are willing to assume both if all present subscribers will pledge themselves to remit one dollar for every year his present subscription calls for and send us one additional subscriber.

The new volume begins with the March issue. Shall that volume be one of a monthly or a quarterly? A coupon is printed below for an expression of your opinion. Signing it incurs no obligation. If a sufficient number are received the March issue will be the first monthly and you will be billed for the extra dollar you may owe. If not, we will tell you more about it in the March issue.

Editor ROCKS and MINERALS,
Peekskill, N. Y.

I am in favor of making ROCKS and MINERALS a monthly magazine at $2 per year and I pledge myself to obtain ..... new subscribers for you. I also agree to remit $1 extra for every year my present subscription calls for.

If the returns warrant the issue of the magazine as a monthly, bill me, and I promise to remit the full amount within ONE WEEK after receipt of your bill.

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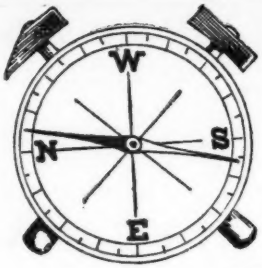

ANY MINERAL YOU WANT

We aim to carry in stock every obtainable species and we sell without net profit.

NEW PRICE LISTS

No. 315, "Inexpensive Minerals," gives prices of five different sizes of thoroughly typical specimens of a large number of different minerals.

No. 318, "Collections of Minerals and Rocks," the best collection list we have ever published, describing all kinds of collections from $1.00 to $6,000.00.

No. 314, "Minerals Sold by Weight." If you wish minerals for determination by the blowpipe this is the cheapest way to buy them.

No. 316, "Rocks." This is a list of over 500 rocks giving prices by weight and also on four sizes of specimens.

No. 325, "Circulars and Price Lists," a list of all we issue.

GOOD MINERALS

Price List 291, "Good Minerals," gives many suggestions as to expensive minerals in stock prior to our round-the-world expedition of 1927-28, which added about $100,000's worth to our stock. A few of our many additions are:

Malachite, polished: 2 x 3 inches, $3.50; larger up to $20.00.

Jasperized Wood, polished sections: from 2 to 5 inches, $1.50 to $7.50; a few large museum specimens $25.00 to $100.00.

Sulphur: groups of large, brilliant crystals, 3½ x 4½ inches, $2.00, up to 5 x 6 inches and larger, $6.00.

Gold crystallized: mounted in glass-covered boxes, $3.00 to $30.00.

Willemite, Northern Rhodesia: very different from the N. J.; masses of brown radiations, fluorescing a beautiful green under the iron arc; 3 x 4 inches, $2.00; 2 x 3 inches, $1.00.

Precious Opal, Australia: glorious specimens and many thousands of dollars' worth of them at $5.00 to $350.00. One customer was so charmed with them that he bought over $4,000's worth.

APPROVAL CONSIGNMENTS

If you want fine or rare minerals, we suggest that you send us satisfactory references and we will then be pleased to send you an approval consignment from which you can select whatever you want.

WHY OUR PRICES ARE LOW

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THE OPAL: BEAUTY MOST MALIGNED

By J. William Yates, Jr.,
Birmingham, Ala.

Ruskin in his lecture on art says: "The Opal * * * when pure and uncut in its native rock * * * presents the most beautiful colors that can be seen in the world, except those of clouds." Certainly this ranks the opal high among the beautiful things in creation, and tends to convince us that for chromatic value it is without a rival on earth.

"Every power, whether religious, civil or individual, has required precious stones—the cross of the bishop and the parure of the millionaire's wife, have alike demanded gems and jewels."[1] And why? Because they are subjects of beauty, and a thing of beauty is a joy forever. Taste is mercurial; beauty is lasting. Civilized and primitive peoples have been fascinated by the flash of the ruby, the soft blue of the sapphire, the living green of the emerald and the rainbow tints of the opal. Such beauty is not transient; it remains to charm and edify with an eternal appeal.

The opal was not engraved by the ancients.[2] Perhaps it was considered in the nature of a sacrilege to deface it. Certain it is that in the voluptuous regions of the east it was appreciated and prized. Pliny tells us that emeralds were forbidden to be scratched, and the opal may have been given like protection by imperial edict. In this connection it may be mentioned an exception was made in favor of royalty, for the celebrated signets of Polycrates, Alexander and Ptolemy Lathyrus (presented to Lucullus) were all in emerald.[3]

The allegorical origin of the opal has been gracefully told in verse. It is represented as the offspring of the union of the Sunbeam and the Moonbeam, following an ardent courtship. The Sunbeam wooed the Moonbeam and she, shy maiden, fled from her suitor and hid in a niche of rock. But the "white fire" of the "orbed maiden" was subdued by the bold and determined Sunbeam. The sequel is best told in the following stanzas from the pen of Ella Wheeler Wilcox:

Just as the day lay panting
  In the arms of the twilight dim,
The Sunbeam caught the one he sought
  And drew her close to him.

But out of his warm arms, startled
  And stirred by Love's first shock,
She sprang afraid, like a trembling maid,
  And hid in the niche of a rock.

And the Sunbeam followed and found her
  And led her to Love's own feast;
And they were wed on that rocky bed,
  And the dying day was their priest.

And lo! the beautiful Opal,
  That rare and wondrous gem,
Where the Moon and the Sun blend into one,
  Is the child that was born to them.

No woman, however fickle, varies her moods with more sudden certainty than the opal changes its colors, but womanlike, it changes with winning charm. Its angular patches of color shift with flowing radiance, as if by magic. Kaleidoscopic these patches are, ever dancing and playful. Viewing Nature's handiwork, it is doubtful if there is another example of so much beauty lavished in so small space as the opal. The ancients esteemed it a very precious stone. Pliny gave it rank after the emerald, and his description is both unique and fitting, in that he says it embodies in one stone the colors of many gems: "There is in them a softer fire than in the carbuncle, there is the brilliant purple of the amethyst; there is the sea-green of the emerald—all shining together in incredible union. Some by their refulgent splendors rival the colors of the painters, others the flame of burning sulphur or of fire quickened by oil."[4]

Tinctorial matter is incorporated in the cornflower-blue sapphire, the pigeon-

blood ruby and many other gems, but the opal contains hardly a trace of coloring matter. Transmitted light shows it to be a solidified gelatinous mass, not unlike a fragment of glass, slightly milky or cloudy in appearance. Whence comes this feast of beauty then? It is naught but an optical property, the internal construction being such as to enable the gem to break up white light into its constituent colors. Long ago hot percolating waters carrying silica in solution deposited the colloidal mass in the cavities and fissures of rocks and locked it in with a time-lock of perhaps thousands of years. It cooled and hardened and in so doing set up a peculiar internal structure,. Close examination reveals the presence of minute fissures which in some cases have been filled with another generation of silica yielding opal with an index of refraction differing from that of the parent mass.[5] So the material within itself splits up white light into its component colors, thus forming the exquisite polychromatic mosaic, so characteristic of this peerless gem.

In the black opal shades of red and green predominate, but occasionally one sees a play of violet or peacock blue of wondrous beauty, colors to be found on the palette of the master artist, Nature, with one of which she touches the petals of a shy wild flower, the other the wings of a tropical butterfly. We gaze upon a fire opal and it evokes no admiration; it is naught but a mass of pellucid quartz, lifeless and ordinary, but a slight rotary movement and lo! a crimson flash fascinating to the eye, and as mysterious as the lightning's play in the far away fleecy clouds. It is the thrill which sheer beauty engenders. Examine a black opal from the Lightning Ridge mine in which the warm colors predominate and you may observe the soft tint of the afterglow, tempered by the creeping shadows, or it may be the deep blush of dawn crowning the mountain top with glory.

Let us now attempt to trace the origin of the superstition regarding the opal. Is it possible one of the most beautiful objects in nature is the harbinger of ill luck? Does the shadow of sorrow hover near the divine play of color of this remarkable stone? Can the opal with its captive rainbow hues have a baneful effect upon the wearer? Surely not, for this paragon of beauty must bring pleasing, uplifting emotions to all lovers of Nature's choice gifts.

It is not to be denied that woman is the appreciator and wearer of gems and jewels; custom has ordained that she bedeck herself with these bits of beauty, but many of the fair sex look askance at the opal, while others look upon it with feelings akin to abhorrence. Not long ago a cultured little woman gazing upon a black opal from the Lightning Ridge mine gave vent to her feelings in unequivocal terms: "Nothing could induce me to have it in my possession for one fleeting moment. I would feel a curse had been placed upon my head." It is unfortunate to be thus superstition-ridden; but what give birth to the superstition that took such a firm hold upon lettered and unlettered alike—a hold that would not relax even under influence of logic? The answer is simple and direct—one of Scott's novels published a century ago. So eminent an authority as George F. Kunz says: "There can be little doubt that much of the modern superstition regarding the supposed unlucky quality of the opal owes its origin to a careless reading of Sir Walter Scott's novel 'Anne of Geierstein.'" It has been said that twelve months after the publication of this story opals in European markets had depreciated fifty per cent in value.

Scott's story, which exercised such an electric influence upon taste, was published in 1829. Prior to that time the opal was popular. As proof of this we may mention the jewels of the celebrated French actress, Mademoiselle Mars, one of the richest collections of that day possessed by a private person. The talented and beautiful actress who reigned at the Comédie Francaise for thirty-three years, suffered loss of her jewels by theft in 1828. A catalogue was soon published containing an inventory and accurate description of the missing articles for the purpose of identification. Among others we find:

> "2. A parure of opals, consisting of a necklace and Sévigné, two bracelets, ear-rings, the studs of which are emerald, comb, belt-plate set with an opal in the shape of a triangle; the whole mounted in wrought gold, studded with emeralds."

Mademoiselle Mars was a toasted favorite in Parisian circles, and her parure may be accepted as an example of the style then in vogue. Thus we see the opal was not only popular a short time prior to the publication of Scott's story, but

that this beautiful stone was in high favor among the wearers of jewels a hundred years ago.

Scott has woven a wonderful story about Lady Hermione, a sort of enchanted princess who wore in her hair an opal of rare beauty, which was so sensitively sympathetic as to change its brilliancy and color as the spirits of its wearer changed. When Hermione was mirthful the stone sparkled; when she was angry it shot forth red rays. It quickly changed with the varying moods of its owner. The life of the opal seemed inseparable from the life of Hermione. But more remarkable still, its radiance was forever quenched by a drop of holy water. In the words of the novelist, " * * * the Baron dipped his fingers in the font-stone, and offered holy water to his lady, who accepted it. * * * But then * * * with an air of sportive familiarity which was rather unwarranted by the time and place, he flirted on her beautiful forehead a drop or two of the mixture which remained on his own hand. The opal, on which one of these drops had lighted, shot out a brilliant spark like a falling star, and became the instant afterwards lightless and colorless as a common pebble, while the beautiful Baroness sunk on the floor of the chapel with a deep sigh of pain."

Elsewhere in the text we read: "Alas, Annette!" said the Baroness, passing her hand across her eyes, "of all the gauds which the females of my house have owned, this perhaps hath been the most fatal to its possessors." Here then is the potent curse that so effectively has changed the taste of the English speaking people of two continents — a curse that lived only in fiction, and that condemned a choice and beautiful gift of Nature. George F. Kunz says, "Although superstitious beliefs were rather the rule than the exception in Cardano's time (sixteenth century), none of the silly fancies regarding the ominous quality of the opal were then current. It was reserved for the nineteenth century to develop these altogether unreasonable—and indeed inexplicable—superstitions."

So superstition born of a pen-picture in the pages of fiction practically banished the opal from the realm of jewels—banished the stone that transforms the sunlight, as if by magic, into a rainbow of radiant beauty. The case is, perhaps, without parallel. And the superstition which had its origin in a novel nearly a century ago is today dying a lingering death.

1. Babinet (de l'Institut).
2. Duffield Osborn, "Engraved Gems."
3. C. W. King, Trinity College, Cambridge.
4. Plinii, l. c.
5. Prof. Edward Henry Kraus.

MINERAL LOCALITIES INFORMATION DEPARTMENT

Members desiring information regarding minerals or mineral localities in the following states may obtain it by writing to the Collectors listed and enclosing a self-addressed stamped envelope.

THE NORTHWEST—Washington, Idaho, Montana, Oregon and parts of British Columbia	Dr. Charles O. Fernquist, Curator of Mineralogy, Public Museum, 2316 First Avenue, Spokane, Wash.
Oregon, Southern Idaho, Northern Nevada	Dr. Henry C. Dake, 793½ Thurman Street, Portland, Ore.

MINERAL LOCALITIES OF COLORADO

By Edwin Over, Jr.

SOME MINERAL LOCALITIES OF EL PASO COUNTY

The minerals and localities listed in this article are only those of which the author has first-hand knowledge. Many minerals, once quite numerous, are now rarely found. Dana lists several that are not included below because they have not been found in recent years within the knowledge of the author. Those listed are the ones the average collector would have a good chance to obtain in the field.

Crystal Park Region

Quartz, clear, smoky.
Microcline, common, amazonstone.
Columbite.
Mica, biotite.
Phenacite.
Fluorite.
Hematite after siderite.
Black tourmaline—as inclusions in quartz.
Hornblende—as inclusions in quartz.
Hematite—as inclusions in quartz.

St. Peter's Dome and Cook Stove Mt.

Zircon.
Cryolite.
Arfvedsonite.
Astrophyllite.
Prosopite.
Pyrochlore.
Fergusonite.
Xenotite.
Cassiterite.
Galena.
Sphalerite.

Red Rock Canyon

Celestite.
Agate.

Austin Bluffs

Agate, banded, cloudy. Chalcedony, yellow.

Crystal Park is a large mountain meadow about five miles south of Manitou and at the foot of Cameron's Cone. The park has commonly been credited as the locality for all the minerals found for miles around. The minerals listed as from this locality are found for a mile or two north of the park to the west, on the slopes of Cameron's Cone; and most plentiful to the south and east of the park for several miles. All minerals are obtained from pegmatite veins in a coarse white granite. Quartz and feldspar make up the bulk of the vein material with a varying amount of mica. Red ocher is generally present too. Further east of the park is a belt of reddish granite which separates the white granite from the sedimentary rock and which is generally barren of specimen minerals.

The large smoky quartz group of crystals, shown in the illustration, was found about two miles to the southeast of the park. The circumstances surrounding the discovery of the pocket that produces this and other fine specimens are perhaps worthy of note as showing the large part luck plays in prospecting.

Six years ago last summer the author prospected the region to the south of Crystal Park and was attracted by a large pegmatite vein but prospected it by only one small hole, perhaps two feet in depth. The indications were not good and the vein was soon forgotten. Three years later while hiking through this region the author picked up a small but very beautiful smoky quartz crystal and upon prospecting up hill about fifty yards again found the large pegmatite vein and the previous excavation. Upon digging on the vein about fifteen feet further along a partially developed quartz crystal, at least a foot in diameter, was found. A little more digging and four well-formed smoky crystals, averaging about ten pounds each, were obtained. More digging exposed several groups and many single crystals, also a large amount of white microcline and small amounts of fluorite and hematite after siderite. No mica was present. So far about 500 pounds of the above minerals have been taken out and as far as can be judged, the pocket has hardly been touched. The upper end of the workings is now directly under the first hole and discloses the fact that another two feet would have broken into the pocket. The little crystal that led to the discovery was found to have come from a stringer of the main vein.

Bear Creek Canyon is a good locality further to the south and the minerals found are the same as those of the Crystal Park region. Specimen Rock, the locality from which topaz and phenacite were first reported in the State, is located on one of the slopes of the canyon.

Red Rock Canyon is in the Fountain formation of red sandstone, as is The Garden of The Gods, and is about two miles to the south of the garden. The celestite locality in The Garden of The Gods is now exhausted but the same light-blue celestite is now obtained from cavities in the sandstone of Red Rock Canyon. Occasionally bits of agate are to be found, evidently weathered out of the conglomerates.

Austin Bluffs is a city-owned park three miles to the northeast of Colorado Springs and here is found agate and chalcedony which have been weathered out of the white limestone conglomerate that the bluffs are composed of.

A fine group of smoky quartz crystals found by the author about two miles southeast of Crystal Park.

Cook Stove Mountain and St. Peter's Dome are just to the west of Cheyenne Mountain and about four and six miles, respectively, southwest of Broadmoor. They are easily reached by the Corley Mountain Highway. Brilliant small gemmy crystals of zircon are obtained from the face of an abandoned mine tunnel near the northeast base of St. Peter's Dome. They are embedded in white quartz and kaolin and occasionally too with galena. The zircons listed by Dana and Kunz as coming from Cheyenne Mountain are without doubt from this occurrence, as Cheyenne Mountain is very unproductive. It is in this region that J. D. Custer of Colorado Springs found Fergusonite, the first to be reported from the State. Mr. Custer also recently found the rare prosopite and pyrochlore in the cryolite veins of St. Peter's Dome. Near the base of Cook Stove Mountain is the bastnasite-tysonite locality but the exact spot has been lost with the death of several of the early collectors. Xenotime, sphalerite and cassiterite are but rarely found. Arfvedsonite and astrophyllite are common and occur embedded in quartz and feldspar veins. Brown opaque zircons show up somewhere in nearly all the veins of the region.

The mineralized areas described lay mostly in a belt from 8,000 to 10,000 feet in elevation along the eastern slopes of the mountains. The district is well timbered and watered and the numerous rock slides, with the absence of dense ground vegetation, makes prospecting easy. Foot trails and auto roads are plentiful and many good localities can be reached with little effort, but generally speaking, the best specimens go to the collector who is willing to work away from the trails. Most of the localities are on government land and the individual is free to prospect where he pleases.

At a recent meeting of the Northwest Mines Association, Charles C. Fernquist, Curator of Minerals at the Spokane, Wash., Museum, was placed in charge of mineral and ore exhibits during the convention. Many fine specimens from the mines of the Pacific Northwest were on display.

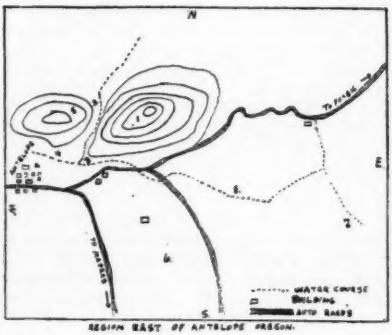
QUARTZ AT ANTELOPE, OREGON

By Dr. Henry C. Dake, President,
Rocks and Minerals Association.

Antelope, Oregon, is located in north-central Oregon, about 70 miles south of the Columbia River, and is accessible via an excellent highway. The locality is in a region of semi-arid climate and the surrounding country consists of a series of low rounded sage brush covered hills, extensively dissected by shallow gullies. The locality is included in the vast region covered by the "Columbia River Lavas" of the Miocene Period. Much of this ancient capping in which the quartz was deposited has been eroded away, leaving the geodes and chalcedony masses lying loose in the debris. Evidence that the geodes were deposited in "steam holes" in the lava is indicated by the uniformly scoriaceous exterior of the geodes. No geodes were noted *in situ* in the uneroded lavas remaining.

Much of the chalcedony found here is suitable for cutting and polishing and is of a green and white color, with bands of red. Some low grade opal and massive calcite is often found with the chalcedony. Irregular masses of chalcedony, a foot or more in diameter, are common occurrences.

The geodes vary in size from quite small up to three feet or more in diameter and are more or less circular in shape and generally hollow, some are completely filled with secondary quartz and calcite. The hollow geodes are lined with clear, well-terminated quartz crystals, which are packed closely together and line the geode walls uniformly. The longest quartz crystals noted are about two inches in length. Some of the smaller geodes are lined with amethystine quartz or stained a reddish color.



REGION EAST OF ANTELOPE OREGON.

The largest intact geodes have been found in a dry creek bed (localities 3 and 4 on map) partly or wholly covered with loose erosion debris. The largest geode seen by the writer at this place was about three feet in diameter and in addition to the lining of quartz crystals also showed calcite crystals three inches in length and well terminated. Some very excellent chalcedony has been found at Localities 2, 3 and 4. Localities 1 and 5 are at the summits of two low hills where smaller geodes are found.

Very large slabs of chalcedony covered with quartz crystals have been uncovered at Localities 6, 7 and 8, some of the rounded fragments measuring four feet or more across and indicating that geodes of an extraordinary size had been formed in the lavas.

Owing to the large amount of quartz present and to the huge size of the individual geodes, it is reasonable to assume that the quartz was deposited by magmatic waters. The "Columbia River Lavas" cover an area of nearly 200,000 square miles and at no other place in these lavas is the writer aware of a similar quartz geode occurrence.

Much of the better surface material has been removed by collectors and lapidarists, but future weathering and the shovel will undoubtedly yield more. Many of the large geodes found here are suitable for museum display.

AGATE FOUND IN AN OLD ABANDONED QUARRY

By Louis Reamer,
Orange, N. J.

To find specimens of agate in a trap rock quarry that is unknown for mineral deposits seems impossible. It is interesting to note, however, that while making observations of the Spottiswoode & Cusack trap rock quarry at Walker Road, Orange, N. J., about three years ago, I noticed an unusual formation of rock indicating remains of volcanic action. At the southwest corner of the quarry were observed large curved plates of hard, dark-green trap rock. But it was at the northwest corner of the quarry that I uncovered several specimens of weathered agate, some deeply pitted.

The discovery was by mere accident when a wasps' nest was disturbed and the angry pests started in for battle. At this position of defense, with the aid of a small branch from a hickory tree, I brushed away some damp leaves where the wasps at one time had their comfortable little home, when to my surprise I noticed a small fragment that resembled agate. My time was then devoted to research work regardless of a few straggling wasps that were out for vengeance. I uncovered 17 samples of the blue-banded variety of agate and they were taken to Mr. Cusack, at one time part owner of the abandoned quarry. His remarks were that many of the road beds in the Oranges were constructed with the rock from his quarry, possibly 25 years ago, and this was the first he knew of any minerals in the quarry.

SPOTTISWOODE—CUSACK QUARRY.

BENTONITE, A MINERAL OF MANY POSSIBILITIES

One of the oddest and least known mineral substances is bentonite, according to the United States Bureau of Mines, Department of Commerce. Certain bentonites have such strong affinity for water that they are capable of absorbing more than ten times their volumes of water. Owing to its peculiar physical properties bentonite has been suggested as a component material in the manufacture of a great variety of commodities as diversified as paper, rubber, putty, phonograph records, pencil leads and soaps. On the other hand, underground deposits of bentonite have caused great difficulties in the drilling of oil wells, it frequently becoming necessary to take special steps to combat the nuisance.

The properties, mining, preparation and utilization of bentonite have formed the subject of an investigation recently conducted under a cooperative agreement between the United States Bureau of Mines and the Mackay School of Mines, University of Nevada. A large number of samples of bentonites from many sections of the United States were studied in the course of this investigation.

Bentonite is a rock that contains 75 per cent or more of the crystalline clay-like minerals montmorillonite or beidellite, state C. W. Davis, associate chemist, Bureau of Mines, and H. C. Vacher, graduate research fellow, University of Nevada, in Technical Paper 438, just published.

For a long time, investigators have recognized the occurrence of a peculiar clay-like substance which, when wet with water, resembled soft soap and was called "mineral soap" or "soap clay." Early reports show that such material had long ago been used at the Hudson Bay posts in Canada for washing blankets.

The first shipments for commercial purposes were made in 1888 by William Taylor of Rock Creek, Wyo., after whom the material was called "taylorite." In 1898, however, it was learned that the name taylorite had already been used as a mineral name for potassium ammonium sulphate, so that this substance was then designated as bentonite from its occurrence in the Fort Benton formation of the Rock Creek district.

At the time considerable interest in bentonite was aroused, but it quickly subsided and the price of $25 per ton was soon reduced to $5 per ton. Within the last few years the interest in bentonite has revived, resulting in investigations that have developed industrial processes and products in which bentonte apparently has an important part. The prices today at Western points for the finely pulverized material approach the first quoted price.

Of the many uses suggested only a few have been tested, and investigators have not worked out the properties of bentonite that determine its usefulness or made tests to determine what type of material is best suited to the different uses.

Bentonite deposits occur in beds from a few inches to many feet thick, mainly in the Tertiary but to some extent in the Paleozoic and Mesozoic rocks in many parts of the United States and Canada, and deposits have been reported from Mexico, China, and France. Most bentonite deposits are the result of devitrification and partial decomposition of glassy volcanic ash.

Bentonite outcrops are unique and striking. As little vegetation will grow on them, they are barren, and because of the peculiar physical properties of bentonite these weathered outcrops often present a crinkled coral-like appearance. If the internal portion of bentonite at an outcrop is dry, it finally absorbs water and swells greatly, producing cracks in the surface layer, which has meanwhile become more or less dry. After a rain many bentonite outcrops are covered with a thick mass of slippery jelly, but in dry weather the surface may be dry and fluffy or may have a peculiar granular appearance.

The bentonite of Wyoming is usually considered a standard type in studying other so-called bentonites. One of the important producers of the material has deposits at Medicine Bow and a grinding plant at Cheyenne. Another important producer in Wyoming has a mine at Clay Spur, near Newcastle. A large new deposit of bentonite has recently been reported in Johnson County.

The largest known California bentonite deposits occur in the arid desert region along the Amargosa River in Inyo County. What is possibly an extension of the Wyoming bentonite occurs near Belle Fourche, South Dakota. On claims owned by one company at this place, there is estimated to be millions of tons of high-grade bentonite. Many other deposits have been found in Nevada, New Mexico, Idaho, Tennessee, Kentucky, Alabama, and other states.

Nearly all deposits of bentonite contain gritty or sandy inclusions, which are considered impurities and must be removed before marketing. Pulverized bentonite is fine grained and commonly light colored, ranging from cream to olive green; but it may be pink, dark brown, or even black, the color usually but not always becoming darker on wetting.. When fired the color is white, buff, or brown. When cut the fresh material usually has a waxy luster which may become dull or powdery on drying. Some varieties may be cut into thin shavings.

Prospectors or others who become interested in the production of bentonite should make a careful investigation of the commercial possibilities of the deposit in question before investing heavily. Such a study should include the possibility of marketing the product, the specifications demanded, the price obtainable, the cost of mining, treating, and shipping to market, the size of the deposit, and the nature of the crude bentonite. One should also realize that most consumers desire a homogeneous product that will remain uniform over a period of years and that deposits containing bentonite which will do this are not common; that most crude bentonites contain appreciable quantities of objectional impurities such as sand, gypsum, carbonaceous matter, or soluble salts that must be removed at considerable expense by washing; and that the purified bentonites from different deposits and even from different levels or parts of the same deposit may have very different properties, such as variation in color, colloid content, and ease of hydration. In general, consumers want a clean, homogeneous, finely divided substance.

Purified, ground alkali bentonite should make admirable fillers, binders or plastics in the manufacture of numerous industrial materials, due to its general characteristics, such as extreme state of fine division, property of remaining in suspension, plasticity, and high absorbent power. Thus bentonite should be useful in the manufacture of paper, linoleum, curtain cloth, cordage, rubber, ceramics, Portland cement, lubricating greases, putty, phonograph records, crayons, plasters, paste, glue, shoe and stove polishes and numerous other materials.

The characteristics of bentonite as an absorbent, emulsifier or peptizer, should make it available in the manufacture of soaps and detergents, horticultural sprays, animal dips, insecticides, fungicides, paints, inks, water-proofing plasters and dynamite; in the de-inking of printed papers, the refining of oils and fats, and in the removal of water from petroleum. As a chemical re-agent bentonite should be of value as a water softener, as an aid to soil fertility, and in the treatment of molasses. It is also suggested for use as a medical dressing, in certain drugs, and in beauty clays.

The results of this investigation are given in Bureau of Mines Technical Paper 438, which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a price of 10 cents per copy.

LITTLE JOURNEYS

By Albert C. Bates
Newark, N. J.

This is the continuation of an interesting series of articles on dealers and collectors that flourished forty years ago.—The Editor.

My last stop was in Richfield at the home of Calvin Mitchell seeking Diopside crystals.

Not at all discouraged from lack of success in finding any specimens worth while, I determined to go to Gouverneur to see the collection of Mr. William H. Andrews which had become quite famous for its showing of local minerals. I found this collector, a man well advanced in years, standing beside a bench in his spacious yard squaring a beautiful green serpentine. He was not aware of my presence and noticing how concentrated he was on the work in hand, I waited and watched. He dipped the specimen in a barrel of water at his side and turning a grindstone gently trued up the slight inequalities in the mineral; he again dipped it in the water and in doing so espied me. I gave my name and purpose of my visit. He said the piece was about ready for a final polish, that he was going in to dinner, that he had a client to see (he was a lawyer) in the afternoon, and if I would call about five o'clock he would show me his collection.

The collection was a large one, made up mostly of local marbles and serpentines in a great variety of colors and shapes, all of which he had ground and polished "for exercise." There were many fine crystallizations from the several famous localities in nearby towns, with others secured by purchase or exchange. He had no material for sale or exchange or as gifts. That the whole collection would eventually go as it was to the St. Lawrence Academy. He referred me to a young man who lived nearby who also polished serpentine, and from him I secured a nice specimen of his work which I still have.

My visit in the localities named had used up my allotted time for this trip (two days), and I returned to my place at Rockport, Ontario. I cannot say much for the hospitality of the few people I had called to see. The trip was not well considered. I should have gone direct to the mines in as many localities as I could cover in the two days at my disposal.

At Rockport I met the so-called geologist, Mr. Joe Cook, a farmer, advanced in years, yet spry and companionable. To him I related my experience across the St. Lawrence River. After a while he said: "I'll do better by you. This is my busy time, but a day off will do me good. I'll hitch the team to the buckboard and we'll go over around Charlestown Lake. I know the lead mines and I know where that vein of celestite you speak of is—it runs through a pasture we shall drive past."

We started early on a bright morning. Mr. Cook pointed out places where iron was mined in the early days and where brittle black tourmalines occurred in quartz veins in the country rock and the country seemed nearly all rock. We drove over many rock bumpers and long stretches of flat or undulating rock. We came to the celestite locality (it is named in Dana) and inspected it—a trench three or four feet wide running for a few rods through a pasture lot. Crystals could be had by blasting; but only rough cleavages, some of fine blue color, could be found in the trench. A few miles further on we came to the lead mines, then abandoned, but on the dumps some limestone showing galena crystals was obtained and some very good muscovite. It was not five o'clock and we had made but a meager lunch while the horses were being shod. Mr. Cook said he would drive towards home by a different route and stop at his brother's farm for something to eat. We arrived there at about 8 o'clock, were heartily received, and soon had spread before us as good a meal as one could wish for. This was the beginning of the hospitality that was later on to be shown me by my Canadian friends. We arrived at Rockport after 10 o'clock.

I realize how meagre this story is in describing minerals or localities. But to me, aside from the empty bag, the several experiences were really very enjoyable. We hear a lot about the value of the sense of humor. I fully believe in its value.

In the year of 1928 I motored over the same roads on which I had ridden on the buckboard named and found them as perfect as any we have in the States.

Near Eganville, Renfrew County, Ontario, there is a great deposit of phosphate rock in which is found great quantities of apatite crystals of perfect symmetry and in a variety of sizes and colors. I had long wished to visit this locality and so wrote to a man in Eganville from whom I had obtained specimens, only to learn that the mines had closed down, due to the fact that the product could not compete in price with the recently discovered beds of marine phosphate in Florida.

THE PENN STATE POLYLITH

By Eugene W. Blank,
State College, Penn.

On the front campus of the Pennsylvania State College, at State College, Pennsylvania, there stands a thirty-three-foot high polylith constructed of every known variety of building stone found in Pennsylvania.

The polylith, six foot square at the base and weighing more than fifty-four tons, is constructed of 281 samples of stone from 150 different localities.

The relative weathering resistance of the different stones can easily be determined by an examination of the column. Such an examination shows that about twenty-five different rocks have withstood atmospheric alteration remarkably well.

The School of Mines and Metallurgy has on display in the Museum of the School one of the rarest and most valuable collections of mining lamps in the country. There are 129 lamps in the collection, the oldest, a "Spedding Wheel" dating back to the year 1750.

The School of Mines and Metallurgy also has a comprehensive and rare collection of rocks of every known variety in the world. This collection of rocks, numbering over 4,000 and valued in excess of $100,000, is known as the Krantz Collection of Rocks. It was obtained over twenty years ago by Dr. Marshman E. Wardsworth, at one time Dean of the School of Mines and Metallurgy. Dr. A. P. Honess, Associate Professor of Geology, is in charge of the collection at the present time. The rock specimens alone make up a remarkable collection, but the value of the collection is doubly increased by the fact that for each rock specimen there is a specially prepared slide for microscopic study and observation.

Visitors passing near State College should avail themselves of the opportunity of viewing these interesting attractions.

THE PENN STATE POLYLITH.

FIELD MUSEUM NOTES AND NEWS ITEMS

Contributed by
The Field Museum of Natural History,
Chicago, Ill.

Specimens representing volcanic phenomena, from the extinct "Vesuviuses of the United States," collected during the past summer by the Marshall Field, Jr. Expedition to New Mexico, are now on exhibition in Stanley Field Hall at the Museum, it is announced by Stephen S. Sims, Director. Henry W. Nichols, Associate Curator of Geology at the Museum, was leader of the expedition.

The material was collected in the San Mateo and Zuni Mountains, near Grants, New Mexico. Included in the exhibition are lava stalactites from the rim of Flagpole Crater; various contorted lava forms caused by blasts of air and gases from the volcanic eruptions; many examples of "malpais," the rough cindery surfaces of lava flows which in places cover areas of many square miles and which often cut the shoes and feet of travelers; several "volcanic bombs," and various volcanic products such as lapilli, or fine volcanic gravel; volcanic ash changed to bentonite; petrified wood, agglomerate, pumice and other materials.

Most of the New Mexico volcanoes from which the specimons come are estimated to have been active about twelve million years ago, but some of them may have erupted as recently as one thousand years ago.

A large specimen of ore from a mine whose yield of silver, about 500 years before the Christian Era, changed the entire course of civilization by preventing a world-wide Asiatic supremacy which might have lasted to the present day, is on exhibition in the Department of Geology at the Museum.

The ore is from the mines of Laurium (Plaka), Greece. From these mines the great Athenian sea-fighter, Themistocles, obtained the silver which paid for the building and equipping of a great Greek fleet which decisively triumphed over the Persians under Xerxes in the epochal battle of Salamis. Without this fleet, most historians are agreed, the Persians would have been victorious, and the Greek civilization which was the father of modern European civilization would have fallen. Asia would probably have dominated the world, and its grip might have remained unshaken to our own times.

In these days when the cost of great wars runs into many billions, it is interesting to note how little, comparatively, it cost to stem a tide of civilization in Themistocles' day. Records show that the amount of silver obtained from the state revenues yielded by the Laurium mines for the fleet was only 100 talents, or a sum in the ancient Greek coinage equivalent to about $144,600 today. Yet, in the opinion of many authorities, this fleet was of more importance in world history than the fleets of the great naval powers of today, and its victory had a more profound effect on past and modern civilization than the result of the great world war.

The Laurium mines were worked for many years by the ancient Greeks, and they are still important as deposits of lead, manganese and cadmium, which are being mined there today by French and Greek companies. The ore from these famous mines now exhibited at Field Museum contains chiefly zinc and lead, but also has a trace of the silver which was so important in world history.

An exhibit illustrating the source of coal, the relation of the several kinds to each other, and including a complete vertical section of a coal seam, along with specimens of coal from the world's most important fields, is a feature of the economic geology collections at the Museum. Numerous substances obtained as by-products are also shown.

How glaciers have acted upon the earth's surface is well illustrated in a collection of rocks in the department of geology at the Museum. Included in the

exhibit are specimens of glacial markings, and two large rock slabs which show in unusual perfection the effects of glacial planing and grooving of rock.

Diamonds and specimens of rocks in which diamonds are found, as well as specimens of the minerals associated with diamonds, constitute one of the exhibits in the department of geology at the Museum.

Eight specimens of interesting invertebrate fossils found near the Great Pyramid at Ghizeh, Egypt, have been presented to Field Museum by Col. J. H. Patterson, Cairo, Egypt. Another collection of invertebrate fossils, found on the Isle of Wight, has been given to the Museum by Mrs. F. MacDairmid of that island. The collections will be used in the paleontological division of the department of geology.

Several huge spiral fossils, commonly known as "devil's corkscrews," and scientifically designated as Daemonelix, are on exhibition in Ernest R. Graham Hall of Historical Geology at the Museum. They occur standing upright in the soft sandstone ledges of Nebraska and Wyoming. They closely resemble in appearance the spirals of corkscrews, and are composed of siliceous matter. They often are taller than a man, and some have lateral branches which extend as much as 30 feet. Some doubt remains as to their origin, but they are believed to be the natural casts of an extinct plant.

The remarkable range of colors and forms of quartz is illustrated in collections of beautiful specimens exhibited at the Museum.

A group of specimens showing all stages in the manufacture of the common lead pencil is on exhibition in the economic section of the department of geology.

Mrs. Joseph W. Work, of Evanston, Ill., has presented a collection of both cut and mounted gems to the Museum. The collection, which will be used in the department of geology, includes blue pearl, Mexican opals, Australian opals, black opals, Honduras pink opals, rhodolites, kunzite, hair stone, star sapphire, Chinese jades and other stones.

How a synthetic ruby or other jewel can be a "real" jewel, and still not be a genuine one, although only the keenest experts could ever detect the difference, is illustrated in an interesting new exhibit placed on view recently in the H. N. Higinbotham Hall of gems and jewels at the Museum.

The exhibit consists of a collection of synthetic gems which includes two varieties of ruby, fourteen varieties of sapphire, and one of spinel. These artificially made gems are not only perfect reproductions of the genuine ones which come from the mines, but they are real gems in the sense that they are composed of exactly the same chemical constituents as the genuine ones, and are synthesized by a special laboratory process which produces the same result as the forces of nature. By this process raw gem material is obtained of the same brilliancy, hardness and composition as the natural gems. Examples of this synthetic raw gem material, in the unfinished "boules," as well as the finished gems are included in the exhibit. The boules are cut in the same manner that the natural stones are, with the result that "real" gems, practically indistinguishable from the genuine, are obtained.

The synthetic gems, when submitted to chemical and other tests, react in the same way as the genuine. Even many jewelers of long experience and wide knowledge of gems are often unable to be sure whether a stone is synthetic or genuine, according to Dr. O. C. Farrington, Curator of Geology at the Museum, who is an expert on gems and jewels, and the author of several important books about them. Often jewelers or doubting purchasers submit stones to the Museum for determination of their genuineness.

While many important gems have been synthesized by this process, according to Dr. Farrington, certain others such as diamonds, emeralds, topazes and hyacinths, while scientifically possible of artificial production as proved by experiments, have not yet been produced in sufficient size to be of commercial value. The synthetic gems are not cheap, as the method of production is expensive, but nevertheless they cost only a fraction of what genuine gems of equal weight and brilliancy would cost. The synthetic gems of high quality are made chiefly in France and Germany.

A COMPILATION OF GEM NAMES

By GILBERT HART

St. Edwards University, Austin, Texas.

Mr. Hart and ROCKS AND MINERALS will be glad to have readers send in additional gem stone names not here included or suggestions as to any corrections in names which they believe should be made.

This is a continuation of the very interesting compilation of gem names (the largest ever printed) made by Mr. Hart, the first installment of which appeared in the December, 1927, issue of the magazine. This list will be continued until completed.—The Editor.

Macle—chiastolite.

Madeira Topaz — quartz, citrine from Madeira Islands.

Magic Stone—opal, hydrophane.

Magnetite—member of spinel group of oxides; isometric, usually massive or octahedral; hardness 6, specific gravity 5.2; black; oxide of iron; gem names: **Hercules Stone, Lodestone.**

Mahogany Ore — compact mixture of iron and copper oxides.

Malachite—monoclinic, usually massive and botryoidal; various shades of bright green; hardness 3.5 to 4, specific gravity 4.00; hydrous carbonate of copper; gem names: **Azurmalachite, Azurite-malachite, Chalcomalachite, Pseudoemerald.**

Malacolite—diopside, pale colored and translucent.

Male Sapphire — corundum, deep colored.

Marble — calcite, recrystallized limestone; (2) also applied to any ornamental stone which will retain a good polish.

Marcasite — orthorhombic, tabular or massive; pale brass yellow; hardness 6, specific gravity 4.9; iron sulphide.

Marekanite—obsidian, mottled in brown and black.

Mariposite — muscovite, light green color due to chromium.

Marmorosch Diamond — quartz, rock crystal from Marmaros Comitat, Hungary.

Masculine—applied to stones of deep rich color.

Matara Diamond — zircon, colorless to faintly smoky, from Ceylon; (2) also pale brown zircon decolorized by heat.

Matrix—rock surrounding a mineral.

Matura Diamond—reported as an inferior diamond from Ceylon, but the similarity of name to Matara Diamond suggests identity.

Meerschaum—sepiolite.

Melanite—andradite, dull black.

Menaccanite—ilmenite.

Menilite—opal, grayish brown, banded, sometimes concretionary, from region around Paris, France.

Mesole—thomsonite.

Mesolite—a zeolite mineral; monoclinic, usually acicular, colorless to yellow; hardness 5, specific gravity 2.29; silicate of aluminum and other bases with water.

Metaxite—serpentine.

Mexican Onyx — aragonite, banded, mottled or clouded; (2) calcite, varicolored in irregular clouds.

Mica — a group of hydrous silicates characterized by softness and a very perfect basal cleavage, also light in specific gravity; varieties used as ornamentals; **Muscovite, Lepidolite.**

Michel—levynite — barite, peculiar pearly luster.

Microcline — a feldspar; triclinic, usually massive; white to pale shade of red and green; hardness 6, specific gravity 2.57; silicate of potassium and aluminum; gem names: **Amazon Stone, Amazonite, Chesterlite, Green Feldspar.**

Microlite — isometric, in highly complex crystals; red; hardness 5.5, specific gravity 5.56; tantalate of calcium.

Micro-perthite — feldspar, flesh-red, often aventurine, essentially very fine laminations of albite and orthoclase.

Milk Opal — opal, translucent, milk-white to greenish, yellowish or bluish.

Milk Quartz—quartz, milky color.

Milky Quartz—quartz, nearly opaque, milky white, greasy luster.

Mineral Blossom—quartz, drusy.

Mineral Turquoise—turquoise.

Mocha Agate—moss agate.

Mocha Pebble—quartz, moss agate.

Mocha Stone—quartz, moss agate.

Mohave Moonstone—chalcedony, translucent, lilac tinted.

Moldavite — a doubtful species, which may be either obsidian or an artificial slag, or even an artificial glass; color green, transparent with glassy luster; also called by following names: **Bottle Stone, Brighton Emerald, False Chrysolite, Moldauite, Pseudo Chrysolite; Water Chrysolite.**

Moldauite—see moldavite, above.

Monazite—monoclinic, commonly massive; brown; hardness 5 to 5.5, specific gravity 5.25; essentially a phosphate of cerium, with many impurities.

Money Stone — rutile, local name in Pennsylvania.

Monrolite — sillimanite, from Monroe, Orange County, N. Y.

Montana Agate — moss agate from Montana.

Montana Jet—obsidian from the Yellowstone.

Montana Ruby—pyrope.

Montana Sapphire — corundum, dark blue to greenish blue.

Mont Blanc Ruby—quartz, ruby red.

Moonstone—feldspar, oligoclase or adularia, usually shows pearly opalescence; (2) chalcedony, white or gray; (3) gypsum, satin spar.

Moonstone Albite—albite which shows pearly opalescence.

Mora Diamond—quartz, rock crystal

Morganite—beryl, rose-colored.

Moriah Stone — serpentine, verde antique, granular and spotted.

Morion—quartz, deep black to smoky, almost opaque.

Morlop—quartz, mottled jasper.

Moroxite—apatite, deep to bluish green.

Mosaic Agate — aragonite, brecciated Mexican Onyx.

"Moss" — applied to various gems to indicate a dendritic moss-like inclusion of some foreign mineral.

Moss Agate—chalcedony, with greenish to blackish moss-like inclusions.

Moss Jasper — chalcedony, opaque or translucent, full of moss-like markings.

Moss Opal — opal, milky, with black moss-like dendritic inclusions.

Mother-of-Emerald—quartz, prase.

Mother-of-Opal — rock matrix containing minute disseminated specks of precious opal.

Mother-of-pearl — the hard iridescent layer of shells, composed mainly of calcium carbonate.

Mother Stone—quartz, chalcedony.

Mountain Crystal—quartz, rock crystal.

Mountain Mahogany—obsidian, banded.

Muller's Glass—opal, hyalite.

Murchisonite — orthoclase, aventurine, flesh-red with golden yellow internal reflections.

Muriacite — anhydrite, crystallized in broad lamellae.

Muscovite — member of the mica group of silicates; monoclinic, habit tabular; white to pale green; hardness 2 to 2.5, specific gravity 2.86; hydrous silicate of potassium and aluminum; varieties used for ornamentals: **Agalmatolite, Damourite, Fuchsite, Mariposite, Muscovy Glass, Oucosine.**

Muscovy Glass—muscovite.

Myrickite — agate or chalcedony containing bright red cinnabar inclusions, often dendritic.

Nacre—mother-of-pearl.

Nail-head Spar — calcite, composite crystals with long scalenohedron capped by stout rhombohedron.

Natrolite—member of the zeolite group of silicates; orthorhombic, habit prismatic; yellow to green; hardness 5 to 5.5, specific gravity 2.25; hydrous silicate of sodium and aluminum; gem names: **Crocalite, Needle Zeolite.**

Needle Stone—quartz, sagenitic.

Needle Zeolite—natrolite.

Nephelite — hexagonal, usually massive; white to pale colors; hardness 6, specific gravity 2.6; silicate of sodium and aluminum; also called **Elaeolite.**

VISITORS FROM THE SKY

By C. L. Clinton
712 South Avenue, Westfield, N. J.

Meteorites, those frequent visitors from outer space, occasionally become naturalized citizens of our soil after undergoing a rigid immigration inspection as they plunge through our atmosphere, leaving them less formidable in size as well as velocity. It is a case of survival of the fittest—and only a small fraction of those entering our protective envelope ever reach our terrain in a solid state; and of these only those which were originally larger or which approached the earth in a more vertical plane, thus underdoing less frictional resistance, retained their velocity to a higher degree and became but partially consumed.

Meteorite showers are most prevalent in August and November when the earth bisects the orbit of a meteoritic swarm which contains countless particles strung out in a continuous chain encircling the sun. It is held that meteorites originally came from the sun and that they are cold, solid bodies in space, differing from their bigger brothers, meteors, which are of self-luminous and tenuous metallic vapor, supposedly parts of a disintegrated comet.

Meteorites are of two kinds: stony, or Aerolites, and the iron, or Siderolites, of which the former are the more numerous. Included in iron, or Siderolites, are such elements as Nickel, Titanium, Helium, Tungsten, Uranium, Vanadium, Hydrogen, Carbonic Oxide, Magnesium and Silicon. The last two, together with iron, have combined to form peridot crystals in minute quantities.

Strangely enough, although the analyses of meteorites have yielded no new elements, yet they have been shown to contain some minerals which are combinations of elements not found upon the earth. These minerals are Maeskelynite, Schreibersite, Moissanite, Daubrielite and Oldhamite.

Says Garrett P. Serviss in *Curiosities of the Sky:* "Altogether some twenty-five chemical elements have been found in meteorites including the "sun-metal," Helium. The presence of the latter is highly suggestive in connection with the question of the origin of meteorites. The iron meteorites, besides metallic iron and nickel, of which they are almost entirely composed, contain hydrogen, helium and carbonic oxide as previously stated, and about the only imaginable way in which these gases could have been absorbed in the iron would be through the immersion of the latter while in a molten or vaporized state in a hot and dense atmosphere composed of them, a condition which is known to exist only in the envelope of the sun and the stars."

One of the most interesting minerals found in iron meteorites is a carbon which had reached the state of hardness to very near that of diamond. When a fragment of Canyon Diablo meteoric iron was polished in Philadelphia in 1892, it cut the emery wheel to pieces. At first these tiny particles, scattered through the meteorite, were thought to be diamonds, but were later identified as Moissanite, a carbon nearly as hard as diamond. Moissan, the French chemist, made his "diamonds" by a combination of great heat, great pressure and a sudden superficial cooling on a mass of iron containing carbon.

Again quoting *Curiosities of the Sky:* "The fact that these tiny black gems were found embedded in these iron meteorites is another argument in favor of the hypothesis of the solar or steller origin of the latter. If the sun or Sirius was the laboratory that prepared them, we can get a glimpse at the process of their formation. There is plenty of heat, plenty of pressure and an abundance of vaporized iron in the sun and the stars. When a great solar eruption takes place, masses of iron which have absorbed carbon may be shot out with a velocity which forbids their return. Plunged into the frightful cold of space, their surfaces are quickly cooled, as Moissan cooled his prepared iron by throwing it into

water, and thus the requisite stress is set up within, and, as the iron solidifies, the included carbon crystallizes into diamonds. Whether this explanation has a germ of truth in it or not, at any rate it is evident that iron meteorites were not created in the form in which they come to us; they must once have been parts of immeasurably more massive bodies than themselves."

The largest meteorite ever discovered is the Coon Butte Meteorite from north-central Arizona. This monster, which was estimated by scientists to be about five hundred feet in diameter, struck the earth almost perpendicularly with a velocity of about five miles per second. It threw up a crater four thousand feet in diameter and six hundred feet in depth, with a rim rising at its greatest height 160 feet above the surrounding plain. Geological indications favor the supposition that the event did not occur more than five thousand years ago, although the rings of growth in the cedar trees growing on the slopes of the crater show that they have existed there for about seven hundred years.

It has been recently correlated by an ancient chronicle which states that at Cairo, Egypt, in the year 1029 "many stars passed with a great noise." Cairo is about 140 degrees longitudinally east from Coon Butte, so that if the meteorite which made the crater was a member of a flock of similar bodies which encountered the earth moving in parallel lines, some of them might have traversed the sky tangent to the earth's surface at Cairo. That the spectacle spoken of in the chronicle was caused by meteorites is considered very probable because of what is said about "a great noise." Meteorites are the only celestial phenomena attended with perceptible sounds.

If this is true, this year is the nine hundredth anniversary of a great visitor. When, then, may we expect another?

A REAL "ROCK" CRYSTAL

Through the courtesy of Mr. Stanley I. Perham, West Paris, Maine, we are privileged to present to our readers an illustration of a real "rock" crystal. This crystal was found in one of the largest pockets ever opened in the Paul Bennett quarry at Buckfield, Maine. The pocket was about twenty feet long, nine feet wide and from five to eight feet high. It was lined throughout with fine quartz crystals, many of them ranging from a foot to eighteen inches in length and from six to ten inches in diameter, for the most part milky-white in color. It must have been a most startling sight when the pocket was first disclosed and it would have been a magnificent mineral formation if it could have been kept intact.

The crystal illustrated is thirty-six inches high, twenty-four inches over all in diameter and weighs in the neighborhood of 500 to 600 pounds. It is doubly terminated and for the most part is a beautiful translucent milky-white color with the middle of the crystal showing some transparent spots of smoky quartz. It was found five years ago.

A REAL "ROCK" CRYSTAL.

BUREAU OF MINES NOTES AND NEWS ITEMS

Contributed by the United States Bureau of Mines,
Washington, D. C.

An exhibit of ore specimens, containing most of the typical ores and including ore samples from many of the large mines of the world, has been arranged by the Rare Metals and Non-Metals Division of the United States Bureau of Mines in the corridors of the Bureau's administrative building, 17th and F Sts., N. W., Washington, D. C. The arranging of the exhibit has been made possible through the cooperation of the several experimental stations and field offices of the Bureau, the United States National Museum, and private individuals.

A novel feature of the exhibit is a collection of balls or spheres composed of the various metals. These balls, which are six inches in diameter, now include practically all the common metals. There are now on hand balls made from aluminum, antimony, chromium, copper, iron, cast iron, lead, magnesium, manganese, nickel, silicon, tin, and zinc. Most of the balls have been furnished through the courtesy of metal mining or metallurgical companies.

A chunk of ferro-tungsten, weighing about 370 pounds, has been furnished the Bureau by F. M. Becket, President of the Electro-Metallurgical Company, for the purpose of cutting a sphere of this alloy. Several efforts were required for the making of a chunk sufficiently solid and homogeneous. The Rare and Precious Metals Experiment Station of the Bureau, Reno, Nevada, is making a ball of tellurium from oxide furnished by the Anaconda Copper Mining Company. Balls of bismuth and cobalt are yet to be obtained.

Another interesting feature of the exhibit is a collection of radio-active minerals. These include ores from all of the important radium producing deposits of the world, including Katanga; Jachymov, Czecho-slovakia; Cornwall; Central City, Colo., and the carnotite regions of Colorado and Utah; individual radio-active minerals from Brazil, Canada, Ceylon and other places.

Considerable historical interest attaches to a graphite deposit near Sturbridge, between Worcester and Springfield, in Massachusetts. This mine was not only the first graphite mine worked in the United States, but was one of the first mining ventures of any kind in America. It was first secured by a grant to John Winthrop, Jr. (son of Governor Winthrop of Massachusetts), who also purchased the tract from the Indian inhabitants between 1644 and 1658. The preliminary operation appears not to have been successful, but in 1738 mining was resumed, and one or more shipments were made to England, where the material brought about 4 pence a pound. Less than one ton was extracted in the summer of 1740, and there is no record of further development until 1828-29, when it was operated by Frederic Tudor of Boston as an adjunct to the manufacture of crucibles. After being idle for many decades it was eventually sold in 1902, after which it was operated intermittently for a few years. One lump of solid graphite weighing 510 pounds was reported to have been taken out in 1904.

Like all of the rare metals, its very rarity gives tantalum a touch of mystery that makes it attractive to many; but like the other rare metals, not including the precious metals, its sources, uses, and markets are very limited.

Tantalum is found in comparatively few minerals and under narrow geologic conditions. It is one of a pair of metals that are unknown separately, although columbium, the other member of the pair, is sometimes reported alone in minerals. The metals are very difficult to separate, possibly more so, excepting zirconium and hafnium, than any other pair of closely associated metals, such as gold and silver, rubidium and cesium, uranium

and thorium, and the rare earth metals.

The tantalum minerals have been found exclusively in pegmatites or in deposits closely related to the pegmatites, and outside the real pegmatites the deposits amount to little.

Although there is a fairly long list of tantalum minerals few are of importance. Columbite is by far the most common and the most important; it is a very variable tantalate and columbate of iron and manganese. If the quantity of columbium is very small, the mineral is known as a tantalite. The content of iron and manganese may also vary. If a tantalite contains almost no manganese, it is dense black and is called tapiolite (also known as skogbolite); if manganese is present to the almost total excluusion of iron, the mineral is a beautiful translucent red and is called manganotantalite. Antimony or calcium may be present almost to the exclusion of manganese and iron, and the minerals are known as stibiotantalite and calciotantalite, respectively. The elements listed above are only the principal elements occurring in these minerals. All the tantalum-columbium minerals contain small quantities of other elements.

A CATALOG OF MINERALS FOUND AT RUMFORD, MAINE

By E. M. Bailey,
Andover, Me.

Rumford, on the Androscoggin, the third largest river in Maine, is more noted for its waterpower and paper making industries than for its mineral wealth. It is near the center of Oxford County and well within the area of the Maine pegmatites, described by Edson Bastin in Bulletin 445 of the U. S. Geological Survey published in 1911. Dr. Charles T. Jackson, who made a geological survey of the State of Maine in the years 1836-1839, visited Rumford in 1838 and in his third Annual Report, published in 1839, says of it: "To the geologist and mineralogist, this locality will prove instructive, for there are many curious, beautiful and useful minerals found in the rocks." He lists the following minerals that came under his observation:

Apatite, Augite, Graphite, Limonite (Bog ore), Red Ocher, Yellow Garnet, Pyroxene, Pargasite, Sahlite, Scapolite.

In Dana's Manual of Mineralogy, 1877 Edition, Rumford is credited with yellow garnet, idocrase, pyroxene, apatite, scapolite and graphite.

Rumford has no mines that are being worked at present, but the dumps of mica and other mines once worked will, with careful searching, often afford the mineral collector and student many nice and rare minerals. The most interesting and promising localities in Rumford are: White Cap Black Mountain mica mines; Ellis River mica mines; the Paint mine; the so-called Nickel mines; Goddard's ledge, and Rumford Falls ledges (along the river both at the upper and lower falls). I have never found vesuvianite (idocrase) in Rumford, though very likely it occurs there, as it is known to occur in Roxbury, an adjoining town.

Below is a list of minerals found at Rumford that have come under my own observations:

Albite, Almandite, Alunogen, Amblygonite, Apatite, Aquamarine, Arsenopyrite, Autunite, Beryl, Biotite, Cassiterite, Chalcopyrite, Cleavelandite, Columbite, Cookeite, Cymatolite, Damourite, Essonite, Ferro-manganite, Graphite, Indicolite, Killinite, Kunzite, Lepidolite, Limonite (Bog Ore), Manganite, Manganocolumbite, Margarolite, Microlite, Montmorillonite, Muscovite, Orthoclase, Plumose Mica, Pollucite, Purpurite, Pyrite, Pyrolusite, Pyrrhotite, Pyroxene, Quartz crystals, Quartz (greasy, milky, rose and smoky), Rubelite, Scapolite, Spessartite, Sphalerite, Spodumene, Staurolite, Sterlingite, Triphylite, Tourmaline (black, light green and dark green), Vermiculite and Zircon.

THE GEM DEPARTMENT

Conducted by
GILBERT HART

Each issue Mr. Hart will give in this department information concerning gems and gem minerals. As Mr. Hart invites correspondence relating to the department, letters should be addressed to him as follows:

Gilbert Hart, St. Edwards University, Austin, Texas.

ZIRCON

Zircon is a name derived apparently from "jargon," meaning worthless, but zircon gems are today in greater demand than ever before. The present mode is especially for the clear brilliant blue variety, which owes its color to artificial treatment of smoky brown stones. Zircon gems are known from before the Christian era, and were included by Pliny and Theophrastus under general names, grouping by color only. It has been suggested that the yellow "ligure" of Aaron's breastplate may have been zircon; its true identity is lost. Agricola knew zircon gems as jacinth, a term which is even now applied by jewelers to red varieties of the mineral. Knowledge of Ceylon gem mines brought to Europe "jargon," the least desirable of all constituents of these gem gravels, whose name was slightly altered to zircon by the 18th Century mineralogists.

This gem mineral is usually found in square prismatic crystals with pyramidal terminations. So common is this shape that among crystallographers "zirconoid" denotes such forms in whatever species they may occur. Other faces of tetragonal symmetry are occasionally present, but usually are subordinate to the prism and pyramids of the zirconoid.

In color zircon ranges through the spectrum from deep red to sky blue. Colorless stones rival the diamond in brilliancy and fire, and may even be mistaken for it. Distinction is made by the lower refractive index of zircon, 1.93 to 1.98, and the doubly refracting character which is wholly absent in diamond. Brilliant cutting shows the colorless gems to best advantage, while colored zircons may be step-cut or otherwise facetted. They are seldom deep enough in color to necessitate cabochon cutting.

Zircon is between quartz and topaz in hardness. It is less brittle than the beryl gems, and lacks the cleavage of topaz, so that it is rather durable as a ring stone. In specific gravity it is variable; most gem zircon has S.G. 4.69, the heaviest of all gems, but there appears to be a variety with S.G. 4.07, which differs slightly in other properties from the usual zircon. Its colors are usually blue, green or brown, and often too cloudy for gem use. Zircon is notable as a doubly refracting mineral with very weak dichroism. This feature coupled with high refraction is distinctive. Chemically it is inert, being insoluble in ordinary acids and therefore is often found in stream and beach gravels. It is the chief mineral carrying the rare metal zirconium, and when massive is mined as an ore.

Hyacinth and its alternate jacinth are applied by jewelers to red-orange and red zircons. These names have also been used for other red stones and in the 18th Century for yellow gems. The aurora-red is now the preferred color for typical hyacinth. Starlite was proposed in 1927 for a brilliant blue zircon from Siam and Ceylon. Apparently it is a brown stone, decolorized by treatment which yields a permanent "electric blue" gem of great beauty. Recently this stone has been the only well-selling zircon, and it is generally sold under the scientific name of the mineral which is really a new term to the jeweler. Colorless zircons have either masqueraded as true diamonds or been known as Matura diamonds from a locality in Ceylon.

Zircon is a rather common mineral in

igneous rocks, being often present in granites but usually only in microscopic grains. It becomes of valuable size only in the pegmatite dikes found in the border region of large granite masses. The most famous American locality is in such a deposit in North Carolina. Some of the Maine pegmatites have yielded good stones. Canada, the Rockies, Norway, Central Europe and Australia have also furnished zircons of gem value. But the pre-eminent locality is Ceylon, where tropical weathering has liberated great quantities of pegmatite minerals and sorted and concentrated the gems in the famous gravel deposits. It is from these placers that most of the gem zircon originates.

A New Moldavite Locality

Moldavite is the name given to a problematical greenish to bluish glass found principally in Bohemia. Its origin is wholly unknown and suggestions have been made correlating it with meteorites, lavas, and even pre-historic glass factories. The most reasonable explanation seems to be that it is of meteoric origin.

Mr. W. W. Ward of Center, Alabama, has called my attention to a glass which is in physical properties very similar to moldavite. In the mass it is a dark green or blue; when cut out in cabochon gems it is usually a very attractive bright blue. Mr. Ward has had several stones cut and mounted in gold. The locality is a small area in the Coose Valley near Center, where an oval-shaped district is scattered with the stone. Associated with the glass are typical meteoric irons, showing the casts of enstatitic chondrules and characteristic etching figures. To the best of our knowledge the glass can be called moldavite, and as such classed with many other materials as a semi-precious stone. No commercial use has been made of moldavite except the few stones Mr. Ward has had cut for himself.

WITH OUR CONTRIBUTORS

J. William Yates, Jr., whose very interesting article on opal, which appears in this issue of ROCKS AND MINERALS, is a graduate of Virginia Military Institute, where he completed the course in general and applied chemistry. While at college he began the study of gems and so keen has been his interest in this subject that it has remained one of his most fascinating pursuits.

For nearly a year Mr. Yates lived in British Guiana. While there he had an exceptional opportunity to study the mineral resources of this interesting but little known country. He saw many beautiful specimens of native gold and examined several thousands of diamond crystals—perfect little octahedral specimens.

At present Mr. Yates is a disbursing agent in the U. S. Veterans Bureau at Birmingham, Ala. We hope that we may have other interesting articles from him in the near future.

A new contributor but an old friend to those of our readers who are members of the Newark Mineralogical Society is Louis Reamer of Orange, N. J. Mr. Reamer's chance discovery of the agate locality near his city is but one example how many interesting minerals are brought to view when otherwise they might never be discovered. We are sure our readers will enjoy this little article.

We are pleased to feature in this issue an interesting catalog of minerals found at Rumford, Maine. This was contributed by E. M. Bailey of Andover, Maine, one of our warm friends and admirers. Mr. Bailey was the 25th subscriber to be placed on our mailing list—his subscription was received July 13, 1926, or practically two months before the first number of ROCKS AND MINERALS made its appearance. Those of our readers specializing in Maine minerals should find Mr. Bailey's list of interest and value.

PALEONTOLOGY DEPARTMENT

Conducted by BENJAMIN T. DIAMOND, M.A.

Mr. Diamond will gladly assist members in identifying their fossil specimens or answering any questions pertaining to fossils. Please write to him direct, enclosing enough postage if a personal reply is desired, specimens returned, etc. Address all mail as follows: Benjamin T. Diamond, M.A., 467 Riverdale Avenue, Brooklyn, N. Y.

GASTROPODS

In the March issue we considered the first division of the MOLLUSCA—PELECYPODS. Another member of this large group is the GASTROPODS which is characterized with few exceptions by the possession of a distinct, well-developed head, soled or fin-like creeping foot and an undivided simple mantle which in most forms secretes a spiral or saucer-shaped shell.

As previously stated the shell only is of importance to the paleontologist as it is the only part which is preserved in fossil forms. Our knowledge of the characteristics of extinct specimens and their relationship to one another and to living forms is based on a consideration of the shell outline and its ornamentation.

The shell material consists of three layers: a chitinous layer, made up of conchiolin, outside; a prismatic median layer of aragonite, and an inner nacreous (pearly) layer.

SHAPES

Discoidal (saucer-shape)—Euphemus, Bellerephon.

Spiral—most any form.

Slipper-shape—Crepidula.

Auriform (ear-shape)—Haliotes.

Twisted—Vermetes.

Convolute (only last whorl visible)—Cypraea.

Nautiliform (like Nautilis)—Cyrtolites, Bucanopsis.

Fusiform (like spindle)—Fusus.

Turritelliform (like Turritella) (long narrow spiral).

ORIENTATION

Posterior is at the apical end; anterior is at the apertural end. To orient: hold the apical end upward with the aperture towards the observer, if the opening is on the right side the coil is dextral; if on the left side the coil is sinistral.

STRUCTURES

Spire—all whorls but the last one.

Body Whorl—the last whorl.

Sutures — external lines of junction between contiguous whorls.

Umbilicus — external depression or opening in the base; a true umbilicus reaches the apex of the shell, a false umbilicus is confined to the last whorl.

Columella—axis of union of successive coils.

Apical angle—angle included by two sides of the spire of a shell.

Varix (varices)—a row of spines or ridge extending across each of the whorls denoting the former position of the outer lip.

Peristome—edge of the aperture.

Lirae—ridge or plications on inside of outer lip (Nerinea).

Callus—thickened part of inner lip (Natica).

Operculum—chitinous or calcareous lip or cover closing the opening (Ceratopea keithi).

Reflected Lip—outer lip twisted back (Bellerephon sublaeus).

Ambitus—greatest circumference.

Fatulous Aperture — expanding, slightly spreading aperture.

Bilobate — deeply lobed outer lip (Protowarthia).

Sigmoid striae—S shaped striations (Loxonema).

Height (length)—measured by a line gin of the aperture.

Convolute — when the later whorls entirely conceal the early ones (Cypreae).
drawn from the apex to the lower mar-

DESCRIPTION OF SOME INDEX GASTROPODS

Oliva alabamensis—spire acute, elevated, whorls scarcely round and suture faintly impressed, a notched spiral above the suture; aperture rather broad; a notched band near base of body whorl. **Eocene.**

Turritella plebia — Whorls convex, suture depressed; spirals numerous. **Miocene.**

Fissuridea griscombi — Subconical laterally compressed surface, plicae strong alternating generally two or three finer ones between two coarser. Enrolled protoconch. **Miocene.**

Loxonema hamiltoniae—Very slender, volutions flattened or slightly concave below, deep sutures, embracing to about one-half shoulder width of periphery. Sigmoid striae. **Hamilton.**

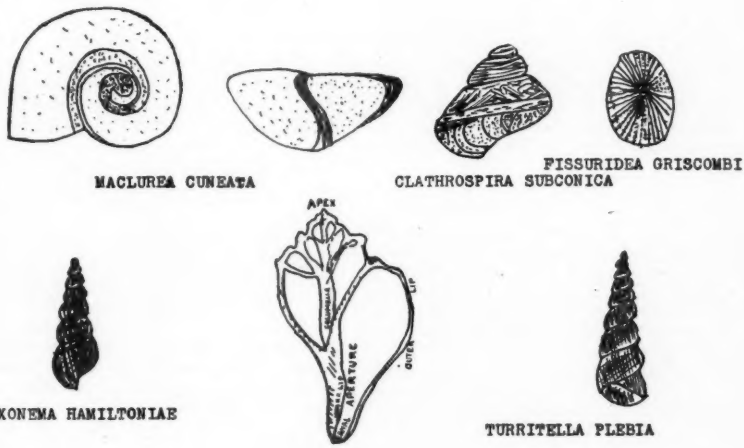
Maclurea cuneata — Medium sized, with small umbilicus and regularly sloping under sides. **Trenton.**

Clathrospira subconica — Volutions flattened above and embracing nearly to periphery; band sharply defined; surface covered by spiral cancellating growth lines.

CORRESPONDENCE

Ernest Martin, San Bernardino, Cal., sent in photograph and specimens collected in San Bernardino. The specimens were identified as coming from the Eocene.

Paul Franz, Eau Claire, Mich., sent in for identification seven specimens which were presented to the department. His specimens were not of organic origin but a form of opalized quartz.



FOSSIL GASTROPODS.

CHIPS FROM THE QUARRY

Fragments gathered by the Editor.

The longest paid-up subscription to ROCKS AND MINERALS—15 years—is held by Russell N. Thatcher, Jr., a young man of Upper Montclair, N. J. It is a renewal and begins with the March, 1931, issue and will expire with the December, 1945 issue. His present subscription does not expire until December, 1930.

One of our most enthusiastic subscribers is Alan C. Thatcher (younger brother of Russell), who is a sophomore at the Montclair High School, N. J. So interested is he in ROCKS AND MINERALS and its success that he has personally written to over twenty old subscribers urging them to renew their subscriptions and have the magazine come regularly to them again. Some of these subscribers have renewed.

Dr. L. J. Spencer, Keeper of Minerals in the British Museum of Natural History, London, England (who has just been elected Vice-President of the Rocks and Minerals Association), attended the 15th International Geological Conference at Pretorja, South Africa, July 29th-August 12th.

Dr. Henry C. Dake, accompanied by Mrs. Dake, spent over a month the past summer visiting the important mineral localities of the Northwest, including Canada. The trip was made by auto and the distance covered was over 4,000 miles. Dr. Dake reports a most enjoyable trip and that many excellent specimens were thus obtained. Part of the time they were accompanied by Dr. Chas. O. Fernquist, Curator of Mineralogy at the Public Museum of Spokane, Wash.

Edmund Cienkowski, Science Teacher of Northeast High School, Philadelphia, Pa., accompanied by two of his proteges, Fred Reinitz and Henry Guenst, visited the world-famous zeolite localities of Nova Scotia during August. The trip was made by auto and stops were made at noted localities en route; a large number of excellent specimens were thus obtained.

Gilbert Hart, formerly of Birmingham, Ala., is now stationed in Austin, Texas, where he is an Assistant Professor in Geology at St. Edward's University.

The Gem Shop of Wolf Creek, Montana, has been using the advertising pages of ROCKS AND MINERALS from its very first issue.

During the first three weeks of October, Ward's Natural Science Establishment of Rochester, N. Y., sent us 51 new subscriptions.

California again leads among states in the number of new subscriptions obtained—27—with Pennsylvania second—21; among cities Philadelphia forges to the lead with 17, surpassing the previous high record of 13 held by Los Angeles.

There is a keen interest for articles on the cutting and polishing of gems, judging from the many letters we have received seeking information on this subject. Can any of our readers supply one?

Aubrey E. Horn in charge of the Naraguta Tin Mines, Northern Nigeria, West Africa, is spending his leave of absence in England.

W. E. Purdin, prospector and student of minerals, has secured some very interesting concentrates from his placers in Curry County, Oregon. Many interesting and some rare minerals are found in the placers of Curry County.

COMMENT AND CRITICISM

To the Editor of "R & M":

All the dealers are passing up a good bet. There are doubtless hundreds of men like myself who are more interested in cut and polished stones than in raw minerals and who get a kick out of cutting and polishing for themselves.

But — *we don't know how.* I have searched every source I know of and have been unable to find literature on this art. If you would collect, arrange and disseminate plain but practical information on the cutting, polishing and carving of gem stones, there is no question in my mind but that you would boost the sales of gem stones many times over.

Can't you find some one competent and willing to write such an article to be published in pamphlet form and sold to your subscribers, or to be published in the pages of ROCKS AND MINERALS?

J. H. HOWARD,
Greenville, S. C.

(We have had quite a number of letters asking for information on the cutting and polishing of gems, and we hope that some one of our readers may be willing to contribute an article on this subject.—Editor.)

To the Editor of "R & M":

I think the September issue was *very* good. The large number of pictures in this number adds materially to the interest of the articles and the magazine. Pictures always tell a story better than words ever can.

Now I am going to offer a few remarks on our last number. It may help you to get some idea as to how others react to the different kinds of articles:

Marble—By W. F. Hunt. This is good and I would like to see Dr. Hunt send in a few more articles.

Borates—By M. Vonsen. This, too, is good but would be even better if it carried more mineralogical data. Mr. Vonsen is well-informed on mineralogy and I was glad to see him appear in the magazine.

Breunnerite—By C. W. Hoadley. Too bad we don't get more little notes like this. There should be more in a mineralogical magazine.

Beryl—This is a dandy. The pictures are excellent.

Caverns—O. K., but more for a nature magazine. Hardly of much mineralogical interest.

Gem Department—Very excellent and according to "Hoyle."

Gilsonite—This is interesting.

Field Museum Notes—This, I think, can be made into one of the most interesting departments in the magazine. I think it will take every reader's eye.

Gem Names—Not original work and the data can be secured readily from reference works.

Little Journeys—Good and interesting.

Sluice Box—This is good and worth keeping.

Membership Page—A good idea. Most everyone likes to see his name in print. I think you added excellently in the short period.

D. C. H.,
Portland, Ore.

To the Editor of "R & M":

I think it will interest the members of the Rocks and Minerals Association to know that lately there has been found galena and orpiment at the Basalt Quarry at West Paterson, N. J.

I had a piece of gem prehnite, which, being too large for the drawers, I had cut in half, and then, to my great astonishment I discovered on the cut faces galena crystals of about ¼-inch diameter and a few minute specks, which under the microscope showed it to be bright yellow lamellar masses, and on analyzing gave an arsenic reaction. The orpiment enclosures are about the size of a pin head.

P. WALTHER,
Elizabeth, N. J.

THE SLUICE BOX

By A. RIFFLE

Two or three times lately I have heard quoted Mark Twain's well known definition of a prospector as "A liar owning a hole in the ground." Nobody quotes and a few seem to know his tribute to the placer miner, so I'll pass it on so that the prospectors will have a comeback when some one brings up the first quotation again. "There lay the mines open to all who work. No capital but a pick and pan required. The most manly independent life on earth. At night you had your pan in your hand, your reward weighed out in virgin gold. If you made five, ten, fifty or a thousand dollars that day you made it from the fall of no man; no decline in stocks or turn in trade which carried some man to the bottom and brought you to the top; no office; no favor, only your own two hands and your strong heart, without favor from any man. You had contributed that much to the commerce of the world. If there is any good in gold you had done that much good to the world, beside the good to yourself." From an item in Feb.. 1906, *The Mineral Collector*.

Again I want to call upon you for a renewed effort to increase the circulation of ROCKS AND MINERALS. One new subscriber will mean but a small effort for you, but if all of us get one it will mean a great deal to ROCKS AND MINERALS. With the Editor doing his part so faithfully and well, it is up to us to give him every bit of support that we can. One way to help is to ask the Editor for some subscription blanks and then include one in every letter you send out. Write him today and get the good work started!

ROCKS AND MINERALS has come a long way since "Old Bill" and I looked over the first copy four years ago. We want all of you who have had a hand in this development to be assured of our best wishes for the New Year for many more of them.

Dr. Frank R. Van Horn, head of the Department of Mineralogy and Geology at the Case School of Applied Science, Cleveland, Ohio, has recently returned from a four months trip to Europe and Africa. He was a delegate from the Mineralogical Society of America, of which he is the secretary, to the 15th International Geological Conference which was held at Pretoria, South Africa. He sailed from New York on May 16th for Germany where he visited over twenty universities and museums of special mineralogical and geological interest, not forgetting his own Alma Mater at Heidelberg.

The object of the International Conference is not so much listening to papers as it is to taking various trips and actually seeing things of geological importance. The conference meets every three years in a different country and will be held in the United States in 1932.

Dr. Van Horn took about 400 photographs while abroad, which he hopes to use in lantern slides, and also collected over one-half ton of specimens and purchased over $1,000.00 worth of fossils, rocks and minerals of various kinds for the Case Collection.

A more complete account of Dr. Van Horn's trip is printed in an October issue of *The Case Tech*, a publication of the Case School of Applied Science.

THE MONTANA MINES EXHIBIT

By an Observer.

That there is a latent interest in minerals and mining among the general public and that this interest can be made greater was never better demonstrated than at the Mines exhibit at the State Fair this year. The possibilities of such displays for arousing an interest in mining, creating a better feeling among the public for increased appropriations for Mining Schools and as a stimulating influence for the development of mineral collecting as a hobby should not be overlooked. Schools of Mines, dealers in minerals, and private collectors, can well afford to take part in such displays in the state and larger county fairs.

The main reasons for the unusual appeal of the mining exhibit this year was that everything was labeled and well displayed and each group under the direction of well-informed and courteous men who could and did answer all questions. Literally, thousands of questions were asked and favorable comments and compliments were heard on every hand.

The Butte School of Mines display, under the able direction of Prof. F. C. Gilbert, assisted by L. I. Nuckols, was an extensive geologic, mining, mineral and milling exhibit. The features were: a gigantic geological relief map, as large as a wall of an ordinary room, showing mountain ranges, rivers and plains to scale and with the various formations in colors; various models, maps, instruments and apparatus, together with the interest-holding actual assaying demonstrations carried on by Prof. Gilbert and Mr. Nuckols. It is safe to say that both to the informed and the uninformed public the School of Mines exhibit this year was the most interesting ever shown.

The Gem Shop of Wolf Creek had two show cases of rough and polished minerals. Most of the minerals were displayed on polished marble bases showing a specimen of the rough mineral and the finished gem. These were displayed for the entertainment and education of the public and not as a commercial proposition and drew interested crowds.

The exhibit as a whole was under the general management of Paul Brazier of Helena, who also took special charge of the unusually interesting and extensive ore displays from State sources. Both old and new properties were well represented. Mr. J. D. McKenzie, General Manager of the East Helena plant of the American Smelting and Refining Company, was active in securing finances for the display, and the plant also had an extensive exhibit of crude and finished products under the personal charge of Mr. G. E. Dewey. Due to the activities of the men in charge and their interest in giving all the available information when requested, this year's exhibit was the most successful of any and probably the best feature on the grounds.

U. S. CIVIL SERVICE OPPORTUNITIES

For those who are interested we are pleased to announce the following open competitive examination to be held in the near future by the U. S. Civil Service Commission, Washington, D. C.

Junior Mining Engineer, $2,000 a Year.

Application for the above examination must be on file with the Commission at Washington, D. C., not later than February 4, 1930.

The examination is to fill vacancies in various branches of the service throughout the United States. Full information may be obtained from the U. S. Civil Service Commission, Washington, D. C.

THE ROCKS AND MINERALS ASSOCIATION

PEEKSKILL, N. Y., U. S. A.

Organized to stimulate public interest in geology and mineralogy and to endeavor to have courses in these subjects introduced in the curricula of the public school systems; to revive a general interest in minerals and mineral collecting; to instruct beginners as to how a collection can be made and cared for; to keep an accurate and permanent record of all mineral localities and minerals found there and to print same for distribution; to encourage the search for new minerals that have not as yet been discovered; and the endeavor to secure the practical conservation of mineral localities and unusual rock formations.

PETER ZODAC

Secretary-Treasurer

Peekskill, N. Y.

Subscribing Membership Blank will be found in the front pages of the magazine.

EDITORIAL

Those of our subscribers who live in sections of the world where winter seasons are more or less severe, and the landscape is covered with ice and snow, are looking forward to that shut-in period when the mineralogical expeditions are out of the question.

A winter, however, gives an opportunity to take account of stock; to go over the specimens gathered in the better seasons of the year; to discard those that are poor, unattractive or of little value; to group those suitable for exchange and to properly classify and label specimens worthy a place in the cabinet.

It also gives leisure for laboratory examinations; to analyze doubtful specimens; to write up more fully notes taken in the field and to lay out plans for expeditions when the snow has disappeared and the freezing winds cease to blow. Winter is not without its advantages.

Although we may covet the opportunities of the Association members living where out-of-door activities do not cease because of weather conditions, yet winter is not without value in stimulating our interest, reawakening our enthusiasm, and adding to our collection by exchanging with collectors in other parts of the country. It also affords leisure for the careful perusal of catalogs of mineral dealers and to make for them a busier season as one increases the size and value of his collection by purchase.

We, ourselves, live in a section snowbound for a part of the year. But our experience has been that it has pleasures even for the mineral collector quite comparable to those of seasons when we can go abroad with our bag and mineralogical hammer.

As this issue is the last before the holiday season, we wish to extend our sincere Christmas greetings and best wishes for the New Year to the members of the Association. May 1930 prosper you abundantly, socially, financially and above all, in the enrichment of your knowledge and your collection of mineral specimens.

THE PRESIDENT'S PAGE

SUPPORT OUR MAGAZINE

By Dr. Henry C. Dake

While our membership has increased at a very gratifying rate the past year, it is as yet not sufficiently large to pull the cost of publishing our magazine "out of the red" or to issue monthly numbers.

As far as the writer can learn, our membership is greater than any other mineralogical association in the world. But due to the very low membership charge (only $1.00 per year), low advertising rates and lacking endowment funds, we have so far not succeeded in making the publication of our official journal self-supporting.

It is the ambition and hope of the officers of Rocks and Minerals Association to publish the magazine monthly and to keep the membership cost at a very nominal figuureu.u uu uuuuuETAOINNNN nal figure. In order to do this the following suggestions have been offered:

1. A larger membership in our association.
2. More advertising matter in our journal.
3. Increasing the membership charge.

While our membership is now relatively large it can undoubtedly be increased materially if the present membership will call Rocks and Minerals to the attention of persons interested in mineralogy. The low annual cost brings the magazine within reach of everyone. A year's subscription to Rocks and Minerals will make an excellent Christmas remembrance to a friend.

It goes without saying that more advertising matter will be a big financial help to the magazine. In view of the large circulation, the advertising returns are quite satisfactory. Members of the association desiring to aid Rocks and Minerals are urged to place their names in the "Professional Directory" of the magazine, or even to insert a small ad in the Classified Columns, thereby also benefiting themselves by getting in touch with other collectors.

In regard to increasing the membership charge in the association, the officers are very reluctant to resort to this until our magazine appears monthly and then probably only a small increase.

It is safe to assume that the majority of the readers of Rocks and Minerals are interested in the study and collection of minerals only as an avocation. It occurs to the writer that a magazine which caters to our "hobby" is worthy of our support. Doubtless there are a number of ways in which our journal can be improved and it is the intention of the editor to add new features and make it larger and even more interesting.

The magazine is published to help keep members informed, to bring them in closer contact and as a medium for the dissemination of mineralogical data. With this in mind we want every member to feel free to contribute to the columns of Rocks and Minerals.

SPECIAL NOTICE

If you are in favor of making Rocks and Minerals a monthly by increasing the subscription price to $2 per year—then read the special announcement on the page facing page 103—fill out the coupon and mail IMMEDIATELY.

MEMBERSHIP DEPARTMENT

New Members Enrolled—August 1 to October 20, 1929

We have much pleasure in introducing the following new members to the Association.

It will also be observed that new names appear on THE HONOR ROLL. We want to extend our thanks to these actively interested members and subscribers to **Rocks and Minerals** and the magazines' advertisers.

THE HONOR ROLL

Members Secured Since January 1st, 1929

Ward's Natural Science Establishment, Rochester, N. Y.	52
The Gem Shop, Wolf Creek, Montana	20
Edmund H. Cienkowski, Philadelphia, Penn.	15
Noyes B. Livingston, Fort Worth, Texas	9
Miss Dorothy Rouse, Philadelphia, Penn.	8
R. J. Santschi, Glen Ellyn, Ill.	7

ARKANSAS

Conway—Robinette, J. H.
Magnet—Kimsey, Joe.

ARIZONA

Nogales—Howell, R. M.
Paloma—Davis, Lew.

CALIFORNIA

Adin—Harper, George J.
Anaheim—Koontz, Robert.
Burlingame—Boehm, Henry.
Colton—Cottrell, J. P.
Engelmine—Engels Copper Mining Co.
Hollywood—Horne, Harold.
Shank, Davis L.
Keeler—Isbister, William.
Kramer—Jones, Dr. R. D.
La Porte—Collins, J. B.
Los Angeles—Crandall, H. E.
Moore, M. S.
Surganty, Mrs. W. J.
Umbdenstock, Inc.
Waldorf, C. O.
Wells, William M.
Waldorf, C. O.
Wells, William M.
Oakland—Brown, Miss Peggy.
Ontario—Young, Lawrence.
Palo Alto—Wilke, R. M.
San Anselmo—Ewing, Gerald B.
San Bernardino—Pywell, Durant.
San Diego—Pfister, Joseph.
San Francisco—Ackerman, C. A.
Hammon, W. C.
Hoffman, Samuel O.
Santa Monica—Servais, S. P.
Weldon—Beaty, Melvin M.

COLORADO

Denver—Tucker, Claude H.
Salida—Mathews, W. D.

CONNECTICUT

Hartford—Newman, Geo. S.
Stevenson, Chas. H.
Lakeville—Hotchkiss School Sci. Club.
New Haven—Lovejoy, Herman S.
Waterbury—Beardsley, Miss Ruth E.
Willimantic—Brown, Miss Fannie E.

ILLINOIS

Chicago—Feckler, Wilfrid.
Klotz, Edward C.
University of Chicago.
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Roanoke—Pettigrew, T. P.

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Peru—Plummer, Jr., George.
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South Bend—Gray, Peter W.

IOWA

Albia—Tomlinson, Henry W.
Belknap—Day, John T.
Clinton—Knappe, Wm. J. H.
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Fairfield—Whiting, Dr. Harry C.
Mason City—Thomas, Leon C.
Northboro—McDanial, F. M.
West Burlington—Jones, Frank.
Kaufmann, Rev. M. J.

KANSAS

Oakley—Hall, Guy.

KENTUCKY

Marion—McDonald, V. C.

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Norway—Fletcher, John H.

MARYLAND

Baltimore—Anderson, H. Wilson.

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Atlantic—Briggs, Miss A. Maud.
Greenfield—Perry, Chas. W.
Lynn—French, J. A.
Marlborough—Rugg, Miss Harriet A.
New Bedford—Auger, Asa.
Springfield—Fitts, William L.
Whitney, Miss Helen L.

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Detroit—Barr, George F.
Russell, Bert.

MINNESOTA

Minneapolis—Mitchell, C. E.

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Kirksville—Rieger, Wray M.
Kirkwood—Rau, D. J.
Moberly—Meals, Mrs. Marion.
Poplar Bluff—Gotthart, Charles.

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Gothenburg—Wiederanders, Arthur.
Seward—Koenig, Prof. Henry A.
Link, J. T.

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NEW HAMPSHIRE

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Keene—Kirk, H. N.

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Mays Landing—Will, Miss Emma.
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Roselle—Horine, F. L.
Trenton—Hilliard, D. G.
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Pike Manufacturing Co.
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Tuxedo Park—Cronon, Miss Pauline.

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Bowling Green—Holt, Wm. P.
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McElroy, M. R.
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Toledo—Heineman, Hal. R.

OKLAHOMA

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OREGON

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Port Orford—Purdin, W. C.

PENNSYLVANIA

Malvern—Goshorn, R. & W.
Mercersburg—Everhart, Mahlon T.
Philadelphia—Ackoff, Albert.
Ambler, Henry.
Bernheimer, Alan W.
Eichna, James R.
Fleming, Alexander S.
Foote Mineral Company.
Guenst, Henry.
Heinecke, George.
Leavitt, William Lloyd.
Lincoln, L. W. Thompson.
Means, Miss Esther B.
Naselow, Morris.
Schaeffer, Bobb.
Schlesinger, Aaron.
Schwan, Frank.
Sharpe, 2nd, Robert.
Werner, Fred.
Schwenkville—C. V. High School.
Shamokin—Simmonds, Joseph F.
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Washington—Lawbie, J. M.
Williamsport—Laux, C. Albert.
Windber—Pfahler, R. G.

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Hiwassee—Cole, J. L.
Riverton—Riverton Lime Company.

WASHINGTON

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Murphy, Joseph.
Seattle—Westerlund, Tenie.

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Milwaukee—Goodwin, George B.
Waterford—Jahren, Rev. H. C. M.

CANADA

BRITISH COLUMBIA

Bridesville—Frank, J. A.

MEXICO

Tampicc—Hufendick, James K.

EUROPE

ENGLAND

York—Holt, Capt. V. H.

GERMANY

Berlin—Kruger, Karl.

AUSTRALIA

NEW SOUTH WALES

Masman—Smith, George.

A Pleased Advertiser

To the Editor of "R & M":

I have just received your letter concerning the renewal of my advertisement. My little ad brought me so many letters and packages of minerals, either for sale or exchange, that my large supply of duplicate specimens is now exhausted and I am forced to drop my advertisement.

I want to thank you for your wonderful magazine with its many interesting articles. You certainly deserve congratulations.

WILLIAM PARRISH,
Philadelphia, Pa.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

of Rocks and Minerals published Quarterly at Peekskill, N.Y. for October 1, 192[illegible]

State of New York
County of Westchester

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Peter Zodac, who, having been duly sworn according to law, deposes and says that he is the Editor & Publisher of the Rocks and Minerals and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

	Name of—	Post office address—
Publisher	Peter Zodac	Peekskill, N.Y.
Editor	Peter Zodac	Peekskill, N.Y.
Managing Editor	Peter Zodac	Peekskill, N.Y.
Business Managers	Peter Zodac	Peekskill, N.Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Peter Zodac — Peekskill, N.Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

Peter Zodac
(Signature of editor, publisher, business manager, or owner.)

Sworn to and subscribed before me this 15th day of October 192[illegible]

[SEAL.] [illegible]

(My commission expires [illegible])

Membership Nomination Blank

Annual Dues U. S. and Possessions, $1 Foreign, $1.25

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Secretary, Rocks and Minerals Association,
Peekskill, N. Y., U. S. A.

Dear Sir:

I nominate for subscribing membership in the *Rocks and Minerals Association* and to receive ROCKS AND MINERALS:

Name .....

Address .....

Name and Address of
Nominating Member .....

.....

(Ninety per cent of the annual dues is designated for subscription to the magazine.)

The Classified Ad Section of ROCKS and MINERALS

Rate 5 cents per word. Three insertions for the price of two. No ad accepted under ten words. Remittance must accompany copy in all cases. Closing dates are: 20th of January, April, July and October. We reserve the right to reject all questionable advertisements.

This section of ROCKS AND MINERALS is producing such excellent results for many of our advertisers that we desire to call the attention of all our readers who may wish to buy, sell or exchange minerals, ores, gems, books, and other material. For best results, an ad should run for at least three insertions. Let our readers get acquainted with you.

ADVERTISING MEDIUMS

THIS PUBLICATION REACHES ALL classes of mineral collectors—beginners and advanced—as well as dealers, schools, colleges, museums and nature clubs. Place your ad in ROCKS and MINERALS and let them read your message.

AGENTS WANTED

WE WANT LIVE WIRES IN VARIOUS sections of the country and particularly in large cities to act as our agents selling subscriptions to ROCKS and MINERALS. Attractive commission offered. ROCKS and MINERALS, Peekskill, N. Y.

BOOKS & PERIODICALS

FACTS ABOUT LOCATING HIDDEN metals, ores, etc., revealed in "Modern Divining Rods." Circulars free. R. Santschi, Box K2, Glen Ellyn, Ill.

EXCHANGES

FOR EXCHANGE — EASTERN PENNsylvania minerals not in my collections—please write. Geo. W. Gehman, 248 Wall St., Bethlehem, Pa.

CORRESPONDENCE PERTAINING TO the exchange of mineral specimens desired. Joseph N. Prokes, R5, Jackson, Minn.

FOSSILS

BROCHIOPODS SHELLS FOSSILIZED in limestone of the Paleozoic Era. Specimens 25 and 50 cents each postpaid to any part of the United States. Address, Ralph B. French, P. O. Box 46, Massena, N. Y.

GEMS

FACETED GEMS—SAPPHIRES, SPINnels, Tourmalines, Zircons, Amethysts, Garnets, Aquamarines, and others. **Cabochon Gems**—Chalcedonies, Chrysocollas, Corals, Crocidolites, Jaspers, Labradorites, Lapis, Malachites, Moonstones, Opals, and others. Send stamp for lists. Shelly W. Denton, Wellesley, Mass.

GEM MINERALS AND SPECIMENS OF the great Southwest for sale. Albert Everitt, Escondido, California.

INDIAN RELICS

I DEAL IN INDIAN PREHISTORIC stone relics, old arms, etc. My selling list ten cents. I want to buy old Indian pipe tomahawks, the older the better; will purchase the pipe hatchet heads where handles are lost, but prefer those with old original handles. Good prices paid in cash. Address, N. E. Carter, Elkhorn, Wisconsin.

LAPIDARIES

LOUIS MARLEAU — CUTTER OF Precious Stones. 234 South Hill St., Oceanside, California.

METEORITES

METEORITES WANTED FROM ANY locality. Will purchase entire falls or exchange duplicates with collectors. Bennet C. Wheeler, Pylesville, Md.

MINERALS

CHOICE GEODES FOR SALE. FRANK Jones, West Burlington, Iowa.

P.S.—Saw your Ad in ROCKS AND MINERALS.

MINERALS

FIVE MINERALS $1.25. L. J. CAMPbell, 856 So. Figura St., Los Angeles, Calif.

A FEW OREGON MINERALS—CHALcopyrite, Chalcocite—25c, 50c, $1. Eight 2 x 2 inch specimens of minerals and rocks—$2 postpaid in U. S. A. Robert W. Haines, Baker, Oregon.

DURING RECENT MONTHS I have added many fine cabinet mineral specimens to my stock. It is up to you to call and look them over! John A. Grenzig, 299 Adams St., Brooklyn, N. Y.

FOR SALE—COLLECTION OF MINerals gathered thirty years ago. Many specimens from Franklin, New Jersey, Zinc Mines. J. S. Martin, 14 Royce Ave., Middletown, N. Y.

MISCELLANEOUS

SCIENCE INDEX KEEPS YOU IN touch with up-to-date information regarding minerals, fossils, palaeontology. Collectors' Directory, Box 99, Station A, Hartford, Conn.

ORES

GOLD, SILVER, COPPER, LEAD, ZINC ores. Set 50c. Minerals identified $1. R. M. Buskett, Joplin, Mo.

PATENT ATTORNEYS

PATENTS: $105 WHICH INCLUDES one-sheet drawings, preliminary search and report whether device patentable and Government fees of $40. Inquiries promptly answered. Milton G. Carver, 212 McLachlen Bldg., Washington, D. C.

WANTED

WANTED—HISTORIES OF ILLINOIS, Texas, California. Books on Minerals, Gems, and Precious Stones. Books relating to Abraham Lincoln, Stephen A. Douglas, Jenny Lind and on the Indians. Christopher Look, 1432 So. Oak Ave., Freeport, Ill.

WANTED—BOOKS ON GEMS, DICHroscope, Gem Scale. The Gem Shop, Box R37, Wolf Creek, Mont.

FOSSILS WANTED—FROM ALL PEriods and divisions in exchange or for cash. Jno. B. Litsey, P. O. Box 592, Dallas, Texas.

WANTED — BEAUTIFUL AND ATtractive minerals, crystals, corals, shells, etc., for decorative purposes. Specimens must be of good size and priced reasonable. Please send full information describing what you have. Rev. M. Wernerus, Route 5, Potosi, Wis.

GEODES WANTED — QUARTZ OR chalcedony, crystal-lined geodes — about 2 x 3 inches. Please write first what you have and give full information before sending. Mrs. Ilsien Nathlie Gaylord, Hotel Commander, Cambridge, Mass.

MINERALS AND SEMI-PRECIOUS STONES

Recent arrivals in cut gem stones are: Green garnet, peridot (Calif. and Egypt), turquoise (Calif., Persia and Africa), smoky quartz, chrysoprase, epidote, hematite, spinel (various colors), pink beryl, golden beryl, and pink topaz (pinked). Agate scarabs, onyx cameii, garnet intaglii in the engraved gems. In some of these we have only a few specimens, but reorders have been placed and we expect to be able to supply them. Our regular stock is also larger and more varied than ever before. Interesting values in garnet, amethyst, citrine, tourmaline, topaz, opal, malachite, tiger eye, sodalite, agates, californite, microcline, satin spar, rose quartz, lapis, chalcedony, carnelian, bloodstone and many others—all in cut stones —and many of them in cabinet specimens—rough or partly finished. Please remember that we handle genuine-mined material only and that we will be glad to send approval selections with no other obligation than prompt, insured return of the material if you do not care to purchase anything.

OPAL

This mineral is a favorite with us and our stock seldom falls below 500 pieces. We can offer you Mexican and Australian opal in the rough, partly polished and in finished gems, with at times some Hungarian and United States opal.

MINERALS

Price List 302 of non-gem minerals and a table of the gem minerals and their varieties, with a table of birth stones, is yours for the asking.

LAST CHANCE GULCH

This summer The Mining Bureau of Helena issued a booklet commemorating the 65th anniversary of the discovery of Last Chance Gulch where Helena is now located. This booklet is illustrated and descriptive of the present mining activities of the district, and contains a good account of the discovery of gold in Last Chance Gulch in 1864. Because of its interesting features we arranged for several hundred copies for distribution among our customers and prospects, and a copy is yours, postpaid, for the asking. Simply ask for a copy of "The Mining Review."

We extend our heartiest Christmas and New Year Greetings to the readers of "Rocks and Minerals."

THE GEM SHOP

BOX R-37 WOLF CREEK, MONTANA

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Real
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PROFESSIONAL DIRECTORY

Rates: One inch $5 per year. One-half inch $3 per year.